



**November 2, 2023 – 4:30 pm**

*Room Voci – Dept. of Physics and Astronomy “G. Galilei”*

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## **Rare earth-diamond hybrid structures for optical quantum technologies**

The challenge of developing hybrid quantum materials aims to associate distinct optically active centers to achieve new functionalities while preserving the underlying properties of each component. In the path of developing integrated optical quantum circuits, the integration of different interacting quantum species is of paramount importance. Here, I will focus on combining two optically active materials that have been broadly used for quantum applications and are compatible with scalable fabrication techniques: shallow NV- color centers in diamond and rare earth (RE) ions in thin films. This is a first proof of the possibility of integrating the rare-earth ions with NV- centers at the nanoscale level for developing hybrid solid state quantum systems.



*Ionut Gabriel Balasa is a postdoc in the Crystal and Quantum State Dynamics group of Dr. P. Goldner at the Chimie ParisTech institute in Paris, France. Here, he studies optical materials for quantum applications such as NV- centres and rare earth ions. Before, he was a postdoc in the NanoStructures Group of prof. G. Mattei where he studied plasmonic nanostructures for applications in biosensing, photoluminescence and non-linear optics.*